Skin cells to beating heart cells in just 11 days

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(Comment: it appears that we already blogged about this study back in February. It's interesting work, though, so this second blog entry gets to remain.)

CIRM grantee Sheng Ding at Scripps Research Institute has converted mouse skin cells into beating heart cells. If this sounds familiar, it's because Deepak Srivastava at the Gladstone Institute for Cardiovascular Disease did something similar last year, but there are a few key differences.

- Ding worked with skin cells whereas Srivastava worked with cells from the heart.
- Srivastava used a group of heart-related factors to push the cells directly into becoming heart tissue. By contrast Ding began by directing the skin cells to become reprogrammed iPS cells, then did a quick change and drove those partially reprogrammed cells to become heart.

The biggest difference is in speed and efficiency. Ding's approach produced beating heart cells in 11-12 days as opposed to 4-5 weeks, and produced those cells in much higher numbers.

In his Nature Cell Biology paper, Ding did point out a few flaws with his approach. First, they need to figure out how to achieve the conversion using transient factors rather than with permanent genetic modifications. Because when it comes to therapies in humans, permanent changes to the DNA - especially with know cancer-causing genes - are frowned upon. They also need to test whether the beating cells can still function when transplanted and don't cause tumors.

Despite these hurdles, Ding and his team say their approach could be effective for a wide variety of cell types. The initial step of partially reprograming the cells would be universal, then it's just a matter of finding which factors push the partially naÃ¯ve cells to form a new cell type.

In a press release, Scripps Research Institute quotes Ding as saying:

> "This work represents a new paradigm in stem cell reprogramming. We hope it helps overcome major safety and other technical hurdles currently associated with some types of stem cell therapies."

This latest paper is one more indication that it could be possible to switch one type of cell into another as a way of repairing tissue damage. However, as with so much in the field of stem cell biology and regenerative medicine, how that approach fits in with ongoing research using adult, embryonic or iPS cells is still anyone's guess.

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- A.A.

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